

AMENDMENTS TO THE DRAWINGS:

Please amend the drawings as follows.

The attached replacement sheet of drawings includes the cancellation of Figure 18. The attached replacement sheet including only Figure 17, replaces the original sheet that included Fig. 17 and Fig. 18.

REMARKS

The Office Action dated October 5, 2005 has been received and carefully noted. The following remarks are submitted as a full and complete response to the Office Action.

Figure 18 is cancelled. The Specification is amended to correct informalities related to the cancellation of Figure 18. No new matter is added. Claims 1 and 3-17 are respectfully submitted for consideration.

The Office Action rejected claims 1, 3-11 and 15-17 under 35 U.S.C. §102(b) as being anticipated by US Patent No 6,000,287 to Menzel (Menzel). This rejection is respectfully traversed.

Claim 1, upon which claims 3-17 depend, recites a capacitive acceleration sensor including at least one pair of electrodes such that each pair of electrodes includes a movable electrode, which is responsive to the acceleration, and at least one stationary plate portion, wherein each pair of electrodes further includes an axis of rotation essentially forming a common axis such that the movable electrode of the acceleration sensor is rigidly supported at the axis of rotation such that the movable electrode is free to turn in a rotational motion about the axis of rotation. Further, in the capacitive acceleration sensor a capacitance change between the movable electrode in rotational motion and the plate portion is enhanced by means of the electrodes. In the capacitive sensor, the capacitance change between the movable electrode in rotational motion and the plate portion is enhanced by means of the shape of the electrodes.

As discussed in the specification, an object of the present invention is to provide an improved sensor structure which improves the capacitive sensitivity of a pair of electrodes based on rotational motion and to measure acceleration with good performance in capacitive acceleration sensor designs. According to the present invention, the shape of the electrode enhances the sensitivity of the sensor element. For example, the sensor can be in the shape of a hammer, triangle or tear drop, as described in paragraph [0018] of the present specification. Applicants respectfully submit that the cited reference fails to disclose or suggest the features recited in any of the pending claims and further fails to provide the advantages thereof.

Menzel is directed to a capacitor center of area sensitivity in angular motion micro-electromechanical systems. The microaccelerometer includes a stationary plate electrode and a moveable plate electrode substantially parallel with the stationary plate electrode. The movable plate electrode rotates through a dielectric fluid about an axis of rotation parallel to the stationary plate electrode in response to acceleration. The center of area of the stationary plate is changed relative to the movable plate to obtain a particular sensitivity. Thus, in Menzel the length of the stationary electrode is adjusted in order to determine the desired sensitivity. Further, Menzel only discloses rectangular-shaped electrodes, see column 1 – column 2 line 8.

Still further, as discussed in the specification of the present invention in paragraph [0054], Figure 5 shows the lowered sensitivity of a pair of rectangle electrodes such as those disclosed in Menzel. As shown in figure 5, curve 13 depicts the best possible

change, expressed in percentages, in the capacitance of an ordinary pair of electrodes with surfaces of rectangular shape (see paragraph [0054] of the present specification). Thus using the redimensioning methods described in Menzel the sensitivity of a rectangular shaped sensor can be adjusted below curve 13, or at most on curve 13. This is inferior to the sensitivity of a pair of electrodes in the triangle shape. This increased sensitivity is shown as curve 14 of Figure 5 of the present invention and described in paragraph [0055] of the present invention.

Applicants respectfully submit that the cited reference fails to disclose or suggest at least the feature that the capacitance change between the movable electrode in rotational motion and the plate portion is enhanced by means of the shape of the electrodes, as recited in claim 1.

The Office Action asserted that Menzel disclosed the feature that the capacitance change between the movable electrode in rotational motion and the plate portion is enhanced by means of the shape of the electrodes, as recited in claim 1. However, the Office Action appears to inappropriately equate the term “shape” with the term “size”. Menzel merely discloses changing the length (i.e. size) of a rectangular electrode, which is not the same as the shape of the electrode, because if the length of a rectangle is changed, it still remains a rectangle. See Menzel at column 1 lines 66 and 67. Thus, Menzel fails to disclose or suggest the feature that the capacitance change between the movable electrode in rotational motion and the plate portion is enhanced by means of the shape of the electrodes, as recited in claim 1.

Applicants respectfully submit that because claims 3-11 and 15-17 depend from claim 1, these claims are allowable at least for the same reasons as claim 1. Further, Applicants submit that Menzel fails to disclose or suggest all of the features of these dependent claims.

Based at least on the above, Applicants respectfully submit that the cited reference fails to disclose or suggest all of the features recited in claims 1, 3-11 and 15-17. Accordingly, withdrawal of the rejection under 35 U.S.C. 102(b) of claims 1, 3-11 and 15-17 is respectfully requested.

The Office Action rejected claims 12-14 under 25 U.S.C. §103(a) as being obvious over Menzel in view of US Patent No. 5,831,164 to Reddi et al. (Reddi). The Office Action took the position that Menzel disclosed all of the features of these claims except for the feature of the sensors formed in the shapes of a triangle, a drop and a hammer. The Office Action asserted that Reddi disclosed this feature. Applicants respectfully submit that the cited references taken individually or in combination, fail to disclose or suggest all of the features of these claims. Specifically, Applicants submit that Menzel is deficient at least for the reasons discussed above and Reddi fails to cure these deficiencies.

Reddi is directed to a linear and rotational accelerometer. In Reddi, a two degree of freedom (2 DOF) accelerometer comprising two imbalanced sensing modules (i.e., bar modules having an unbalance) is provided such that two sensing modules are located in the plane to be measured. The two imbalanced sensing modules have force balance and

are used to measure linear and angular accelerations in two degrees of freedom. A single modular design is used for both of the axes. Each of the two individual sensing modules has a housing containing a proof mass for each measured output and a support of the proof mass with the support optimized for the sensitive axis selected for sensor output and having high rigidity in all other axes of the support. Reddi is relied upon to suggest the feature that a pair of electrodes may be of any shape. The Office Action cites column 6 lines 30-31 of Reddi. However, Reddi fails to disclose or suggest at least the feature that the capacitance change between the movable electrode in rotational motion and the plate portion is enhanced by means of the shape of the electrodes. Therefore, Reddi fails to cure the deficiencies of Menzel.

Based at least on the above, Applicants respectfully submit that the cited references taken individually or in combination, fail to disclose or suggest all of the features of claims 12-14. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) of claims 12-14 is respectfully requested.

Applicants respectfully submit that each of claims 1, 3-17 recite features that are neither disclosed nor suggested in any of the cited references. Accordingly, Applicants respectfully request that each of claims 1 and 3-17 be allowed and this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by

telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Attachment: Replacement drawing sheet